UNITED STATES ENVIRONMENTAL PROTECTION AGENCY



WASHINGTON, D.C. 20460

OFFICE OF
AIR AND RADIATION

July 30, 2018

Dear ENERGY STAR® Partners and other Stakeholders:

The U.S. Environmental Protection Agency (EPA) is pleased to share both an update on <u>ENERGY STAR</u> <u>Most Efficient 2018 and proposed recognition criteria across 14 product categories</u> for 2019. Stakeholders are invited to provide written comments on these criteria no later than **September 5, 2018** to <u>MostEfficient@energystar.gov</u>.

ENERGY STAR Most Efficient 2018

As of July 2018, 2,899 models from 155 ENERGY STAR partners meet the ENERGY STAR Most Efficient 2018 recognition criteria. The number of models and partners per category is noted in the following table:

Product Category	Models	ENERGY STAR Partners	
Boilers	726	29	
Ceiling Fans	24	5	
Central Air Conditioners and Air Source Heat Pumps	165	8	
Clothes Dryers	14	4	
Clothes Washers	72	9	
Computer Monitors	132	21	
Dehumidifiers	14	5	
Dishwashers	71	8	
Furnaces	51	6	
Geothermal Heat Pumps	611	10	
Refrigerators-Freezers	405	30	
Ventilating Fans	195	11	
Windows	419	40	
Total*	2,899	155	

*Total ENERGY STAR partners that meet the ENERGY STAR Most Efficient 2018 recognition criteria is calculated by removing duplicate partners that may appear in more than one product category. Therefore, unlike the Total Models count, the total ENERGY STAR Partners count does not represent the sum of its column.

Over 30 energy efficiency program sponsors are leveraging ENERGY STAR Most Efficient. These partners serve over 14 million households (or roughly 30 million consumers). Their programs feature one or more product categories covered by ENERGY STAR Most Efficient 2018 and reflect a diverse geographic spread, including two water utilities in California.

ENERGY STAR Most Efficient is also being leveraged for retailer incentives as part of the ENERGY STAR Retail Products Platform (ESRPP), an innovative, nationally coordinated, market transformation initiative. In 2016, during its first pilot year, three retailers and eight energy efficiency program sponsors representing 11 states and almost 18% of the U.S participated in the ESRPP. ENERGY STAR certified models in five product categories were promoted by program sponsor-labeled signage in almost 700 stores. Participation

grew in 2017 with new sponsors and the addition of Lowe's and Nationwide Marketing Group. ESRPP retailers now represent more than 80% of the appliance market, with more than 1,200 stores in current program sponsors' service areas. Going forward, the ESRPP is striving for large-scale market participation – serving more than 30% of the US population –a key milestone in the ESRPP vision to transform the market for energy efficient consumer products.

EPA continues consumer education - this year developing and implementing a targeted, social media campaign that drove nearly 1 million impressions with a link to energystar.gov/mostefficient, where partners' products and programs are featured. EPA plans more activities, including geo-targeted outreach that lines up with new product launches – such as a planned heat-pump dryer promotion this fall, as well as a 2019 re-run of the successful 2018 campaign supplemented by more customized product-focused pushes coordinated with our national product promotions, including Flip Your Fridge and Laundry Made Better.

EPA has also made progress in arming consumers with the information they need about recognized products. In addition to highlighting ENERGY STAR Most Efficient 2018 products, our website includes images of models, as well as real-time information on retail pricing and where to locate and buy these models. This information is currently available for ceiling fans, clothes washers, dryers, dishwashers, monitors, refrigerators, and ventilating fans found at select major retailers. EPA plans to have this information available for TVs in 2019.

2019 Product Categories and Recognition Criteria

For 2019, EPA intends to continue to highlight all 13 of the product categories currently eligible for ENERGY STAR Most Efficient recognition, and re-introduce televisions to the portfolio for a total of 14 categories.

The proposed recognition criteria for 2019 were based on an analysis of currently certified ENERGY STAR models and the engineering analysis DOE conducts for covered products. This analysis indicates that for many categories existing recognition criteria remain reflective of the "best of the best." As a result, EPA is extending the 2018 efficiency criteria into 2019 for a number of categories including boilers, ceiling fans, furnaces, geothermal heat pumps (GHP), dishwashers, and residential windows. In addition to adding criteria back in for televisions, EPA has revised the recognition criteria for ducted and ductless central air conditioners and air source heat pumps, clothes washers, computer monitors, dehumidifiers, dryers, refrigerator-freezers, and ventilating fans.

<u>Ceiling Fans:</u> EPA has maintained the 2018 criteria for ceiling fans. With the Version 4.0 specification going into effect in June 2018, the list of ENERGY STAR ceiling fans is significantly reduced. The 2018 criteria were adopted with this revision in mind, and continue to provide distinctly higher efficiency than the Version 4.0 levels. After conversation with manufacturers, EPA expects the list of ENERGY STAR ceiling fans to grow again over time, particularly approaching 2021 when the first minimum airflow efficiency standards go into place. As the market reacts, high efficiency motors are expected to become more common, and therefore, less expensive. EPA has removed the recognition criteria in terms of high-speed efficiency, as all fans are now tested with the annual efficiency metric.

Clothes Washers: EPA has maintained the 2018 energy and water criteria for clothes washers in 2019. The ENERGY STAR Most Efficient list has grown steadily in this category, with 30 models from 11 brands currently recognized, representing 16% of the market. For 2019, EPA has set a minimum cleaning performance floor based on data derived from the ENERGY STAR cleaning performance test method. EPA received cleaning performance test results from partners participating in pilot use of the test method, which included data from 11 models of 5 brands. These models represent a range of efficiencies including models rated at the 2018 ENERGY STAR Most Efficient level, as well models at the ENERGY STAR level, and models only meeting the DOE Federal Standard level. The minimum cleaning performance level of 85 was determined from examining these test results as well as commercial clothes washer cleaning performance data from substantively the same test. The test method reflects the recent DOE waivers accommodating testing of clothes washers with capacity between 6.0 cubic feet and 8.0 cubic feet to be tested by extending the load size table as well as a clarification to Section 4.F.3.b. to emphasize that when loading test cloths with stain strips, testers should minimize any overlap.

<u>Computer Monitors:</u> EPA has maintained the 2018 efficiency criteria as analysis showed that meaningful savings are not available above the current recognition criteria. EPA proposed to apply the resolution allowance to the total resolution rather than capping the allowance at 5 megapixels as data show the average resolution of models earning ENERGY STAR Most Efficient recognition is lower than that of ENERGY STAR models, where resolution requirements are less stringent. EPA intends to recognize higher resolution monitors as Most Efficient with this change.

<u>Dehumidifiers:</u> EPA has maintained recognition criteria in terms of EF and has added recognition criteria in terms of IEF, to accommodate models that are tested and represented using the Federal test procedure for which compliance is required beginning in June of 2019. EPA, in conjunction with DOE, developed the IEF values to be roughly equivalent in stringency to the EF recognition criteria and to coincide with the product class structure for the June 2019 energy conservation standards. In addition, EPA has updated definitions to align with the new DOE definitions. For whole-home dehumidifiers, the 2019 IEF most efficient recognition level for products with less than 8 cubic foot capacity is also broken out separately based on the June 2019 Federal test procedure. EPA expects to propose more stringent criteria in 2020, when transitions for ENERGY STAR and Federal standards are complete and further differentiation will make sense.

<u>Dishwashers:</u> EPA has maintained the 2018 criteria for standard sized dishwashers, including the minimum cleaning performance floor. While the ENERGY STAR Most Efficient list has grown steadily in this category, with 18 models from 7 brands currently recognized, this represents just 8% of the market.

<u>Dryers:</u> EPA is proposing a minor update to the 2018 criteria for dryers. The 2018 ENERGY STAR Most Efficient list with the max dry criteria grew steadily throughout the year, with 11 models from 6 brands currently recognized, representing 5% of the market. In response to utility interest this year, EPA worked with partners to identify dryers that use heat pump or hybrid heat pump technologies. In 2019, EPA encourages partners to complete the optional field when certifying to relay this information, making it easier for utilities to incentivize these technologies in the market.

<u>Ducted and Ductless Central Air Conditioners and Heat Pumps</u>: EPA is proposing to require variable capacity performance for 2019, due to the ability of the technology to provide excellent comfort and efficiency, in all climates. In addition, the technology holds particular promise to increase efficiency and grid stability without sacrificing performance. All currently recognized ductless products meet this requirement, and most central AC and heat pumps products do as well.

Other Heating and Cooling Products: EPA has retained the current recognition criteria for furnaces, geothermal heat pumps (GHP), and boilers. Recognized furnaces represent an elite group of products with exceptional performance. While the number of recognized GHP models continues to grow, overall GHP sales remain very small, and the consumer value in terms of savings and functionality remains significant at the current levels. For boilers, the 2018 criteria remain the best means of differentiating top energy savers. The system status and messaging criteria are unchanged from 2018.

Refrigerators-Freezers: EPA is proposing updated criteria for side-by-side and bottom freezer product types in 2019 to greater than or equal to 20% above the Federal minimum. Currently available refrigerator technologies such as innovative refrigerants and variable speed compressors as well as advancements in vacuum-insulated panels (VIPs) yield significant efficiency improvement. EPA conservatively estimates at least 122 models from 36 brands are able to meet the proposed criteria, which is representative of 11% of the market. While there is currently strong ENERGY STAR Most Efficient representation among top freezer models, EPA is not proposing to move the level, as they remain the lowest energy consuming standard-size refrigerator-freezers. In follow-up to EPA's recognition of products using climate friendly refrigerants through the ENERGY STAR Emerging Technology Award, EPA plans to initiate efforts to highlight partners' use of low global warming potential refrigerants and assist with messaging to consumers about the benefits of this advancement.

<u>Televisions</u>: With finalization of Version 8.0 Program Requirements for TVs in February 2018, EPA is reintroducing this product category to ENERGY STAR Most Efficient in 2019. Version 8.0 seeks to ensure that TV energy saving features persist and deliver promised energy savings without sacrificing

performance. TVs wishing to qualify for ENERGY STAR Most Efficient recognition in 2018 must be certified to Version 8.0. The proposed Most Efficient criteria align with the Version 8.0, and include a high resolution allowance for Ultra-High Definition (UHD) capable products, to target the most efficient UHD capable models.

Ventilating Fans: EPA has slightly modified the ventilating fan recognition criteria in 2019. For bathroom/utility fans, the current efficiency criteria continue to represent an exclusive subset of products and have not been changed. EPA has added a minimum noise criterion for these fans, measured at 0.25 in w.g. static pressure at the fan's highest speed only. This is intended to protect against recognizing fans that are designed in a way that promises degraded performance in poor installations. As such, we intend the level to be one that most or all currently recognized fans can meet. The 4.0 sone level is equivalent to ordinary conversational volume. For in-line fans, while a substantial number of models with airflow below 150 cfm are recognized, there is limited opportunity to increase the levels for higher cfm fans, thus EPA has not revised criteria for these products. During 2018, EPA added in line fans designed to supply air (rather than exhaust it) to the scope of the ENERGY STAR specification, and such fans are now eligible for ENERGY STAR Most Efficient recognition as well.

<u>Windows</u>: No changes are planned for the 2019 residential window recognition criteria. Although 419 window product lines are recognized from over 40 product brand owners, they still represent a relatively small percentage of the market.

The proposed ENERGY STAR Most Efficient 2019 criteria for the full suite of products are summarized below. In addition to meeting these recognition criteria, products must be certified as ENERGY STAR by an EPA-recognized certification body. Additional detail for each product category is included in the recognition criteria documents accompanying this letter.

Category	ENERGY STAR	Most Efficient 2019 i	Recognition	n Criteria	
Boilers*	Gas Powered Boilers: 95% AFUE or higher. Oil Powered Boilers: 90% AFUE or higher				
Ceiling Fans*	Efficienc	High speed effici y as per 10 CFR 430 S			
		Blade span D	(inches)	Efficiency	(CFM/W)**
		19" ≤ 3	6"	≥ 1.03D -	- 60.43
		> 36"		≥ 3.88D - 42.17	
Clothes Washers		Clothes Washer	_	ed Modified	Integrated Wa
		Capacity		factor (IMEF)	Factor (IWF ≤ 3.7
		≤ 2.5 cu-ft > 2.5 cu-ft		≥ 2.2 : 2.92	≤ 3.7 ≤ 3.2
		> 2.5 CU-II		2.92	≥ 3.2
		Total C	Cleaning Sco	ore $(CS_t) \ge 8$	35.0
Ducted	System status ar	nd messaging capabili	ties, variable	e capacity	
Central Air		Product type	SEER	EER	HSPF
Conditioners		Split AC	18	13.0	
and Air		Packaged AC	16	12.0	
Source Heat Pumps*		Split HP	18	12.5	9.6
		Packaged HP	16	12.0	8.2

Product type	EF
Stand Alone	2.2
Whole House	2.3

Or

When complying using representations based on testing in accordance with 10 CFR Appendix X1 to Subpart B of Part 430, portable dehumidifiers with a capacity less than or equal to 50 pints/day and whole-home dehumidifiers with a case volume less than or equal to 8 cubic feet, must have the following minimum Integrated Energy Factor:

Product type	IEF
Portable, capacity ≤ 25 pints/day	1.57
Portable, capacity 25.01 – 50 pints/day	1.80
Whole-Home, case volume ≤ 8 cubic feet	2.09

Ductless AC and Heat Pumps

Products must meet the following cooling and heating performance levels: 20 SEER, 12.5 EER, 10 HSPF (Heat pumps only); system status and messaging capabilities, variable capacity.

Geothermal Heat Pumps*

System status and messaging capabilities; variable capacity except water-to-water models.

Product type	EER	COP
Closed Loop Water-to-Air/GHP	17.1	3.6
Open Loop Water-to-Air GHP	21.1	4.1
Closed Loop Water-to-Water GHP	16.1	3.1
Open Loop Water-to-Water GHP	20.1	3.5
DGX	16.0	3.6

Computer Monitors

Total Energy Consumption (*E*_{TEC}) in kilowatt-hours per year shall be calculated as follows:

$$E_{TEC} = 8.76 \times (0.35 \times P_{ON} + 0.65 \times P_{SLEEP})$$

Where:

P_{ON} = measured On Mode power in watts; P_{SLEEP} = measured Sleep Mode power in watts;

Total Energy Consumption (E_{TEC}) shall be less than or equal to Maximum allowable Total Energy Consumption in kilowatt-hours per year calculated as follows:

$$E_{TEC\ MAX} = 1.9 + (0.12 \times A) + [3.1 \times (r + C)]$$

Where:

A = viewable screen area in square inches;

r = Total Native Resolution in megapixels; and

1.9 if $A < 180 \text{ in}^2$

C = 2.7 if 180 in² $\leq A < 220$ in²

2.0 if $A \ge 220 \text{ in}^2$

Dishwashers*		Product Type Standard Dishwasher		Annual Energy Use (kWh/yr)	Water Consumption (gallons/cycle)		
				≤240	≤3.2		
			Test Cycle	Cleaning Index]		
			Heavy	70			
		_	Medium	70			
			Light	70			
Dryers	Products must meet the applicable energy performance requirements shown in the table below, as determined by 10 CFR Part 430 Subpart B Appendix D2, unless noted otherwise.						
		Cycle Setting		ct Ventless	CEF _{BASE} (lbs/kWh)		
				ic (240V)	≥ 3.7		
		Normal		(All Other)	≥ 4.30		
				Gas	≥ 3.80		
		Normal, Maximum Dryness¹		ct Ventless ic (240V)	≥ 2.68		
				(All Other)	≥ 3.93		
				Gas	≥ 3.48		
Furnaces* Refrigerator- Freezers	Product must h	nigher; system status a nave an Annual Energy	Consumptio	on (AEC) of less	·		
		Top freezers must be a					
Televisions	Product must be certified to the ENERGY STAR Televisions Version 8.0 Program Requirements.						
	The On Mode Power shall be less than or equal to the sum of the maximum allowable On Mode Power consumption and the high resolution On Mode Power Allowance:						
	$P_{ON} \le P_{ON_MAX}$ $P_{ON_MAX} = 66$ $P_{HR} = 0.45 \times 10^{-1}$	* $tanh[0.000412 \times (A -$	140) + 0.01	4] + 14			
	Where: P_{ON} is the On Mode Power in watts; P_{ON_MAX} is the maximum allowable On Mode Power consumption in watts; P_{HR} is the high resolution On Mode Power Allowance in watts; A is the viewable screen area of the product in square inches; and						

¹ For purposes of this requirement, the manufacturer shall test the dryer according to the provisions in the DOE test procedure in 10 CFR 430, Subpart B, Appendix D2, but where the drying temperature setting can be chosen independently of the program, it shall be set to the maximum. At the time of certification, for each basic model the manufacturer shall report per this criteria section the energy performance (CEF), the cycle program name, the temperature setting, the dryness setting, as well as any settings enabled by default, and the time taken to complete the energy test cycle (as defined in the ENERGY STAR Version 1.1 specification, Section 5C).

	tanh is the hyperbolic tangent function.
Ventilating Fans	Bathroom/utility fans: Efficacy at high speed (cfm/W): ≥10 In line fans: Efficacy at high speed (cfm/W): ≥5 In-line Ventilating Fan tested with a filter in place (6≤MERV<13): ≥4.7 In-line Ventilating Fan tested with a filter in place (MERV≥13): ≥3.8 Bathroom and Utility Room Fans must provide a sound level ≤ 4.0 sones at 0.25 inches of water gauge external static pressure at high speed.
Residential Windows*	U-factor ≤ 0.20 in all Zones SHGC in Northern Zone ≥ 0.20 SHGC in North-Central Zone ≤ 0.40 SHGC in South-Central and Southern Zones ≤ 0.25 North American Fenestration Standard/Specification (NAFS) Performance Grade ≥15

^{*}Proposed criteria carried over from 2018 for these categories.

EPA will provide additional information regarding the roll out of ENERGY STAR Most Efficient 2019 recognition with the finalization of these criteria. Products recognized in 2018 that meet the ENERGY STAR Most Efficient 2019 criteria will automatically receive recognition.

EPA will hold a stakeholder webinar on **September 11, 2018 from 12pm to 2pm Eastern Time** to discuss the proposed 2019 recognition criteria. To participate in this webinar, <u>please register here by September 10th</u>. Please share written comments no later than **September 5, 2018** with <u>MostEfficient@energystar.gov</u>. EPA plans to finalize these recognition requirements in September.

Thank you for your support of the ENERGY STAR program.

Sincerely,

Ann Bailey, Director

ENERGY STAR Product Labeling